

BURNETT'S

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SYSTEM OF VENTILATION,

OR

RENEWING THE AIR

IN BUILDINGS, SHIPS, ETC.

PATENT OF JAN. 10, 1865,
TWO PATENTS OF AUG. 15, 1865,
TWO PATENTS OF FEB. 13, 1866,
AND ONE PATENT OF MARCH 27, 1866.

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B. J. BURNETT,
MOUNT VERNON, N. Y. *or*

at The Novelty Iron Works

NEW YORK:
MACDONALD & SWANK, PRINTERS, 37 PARK ROW,
1866.

VENTILATION !

THE UNDERSIGNED is now PREPARED to furnish and apply any of the several devices, in his system of **renewing, or exchanging the impure air for pure, in all kinds of buildings, shops, or ships: all upper apartments and the lofts under the roof, may, by this system of ventilation, be RENDERED COOL AND HEALTHY, AT A TRIFLING EXPENSE.**

It is also peculiarly adapted to exchange the air in the hall-ways of all dwellings, by being placed in the roof over the stair-way: serving the double purpose of Ventilator and Sky-Light.

The most important improvement yet made in ventilating, is

BURNETT'S COMBINATION VENTILATOR, by means of which, the air in each and every apartment in the house may be constantly exchanged, be the apartments closed or otherwise.

A large working model (in operation) may be seen at **THE NOVELTY IRON WORKS**, which will demonstrate how the above is accomplished.

B. J. BURNETT,

Novelty Iron Works,

Foot of 12th Street, East River, NEW YORK.

Wall Street Journal

BURNETT'S HORIZONTAL VENTILATOR.

This style of Ventilator is adapted to side walls of buildings, to ventilate apartments of any size through the same.

Its adaptation to all sleeping apartments must be experienced before it can be fully appreciated.

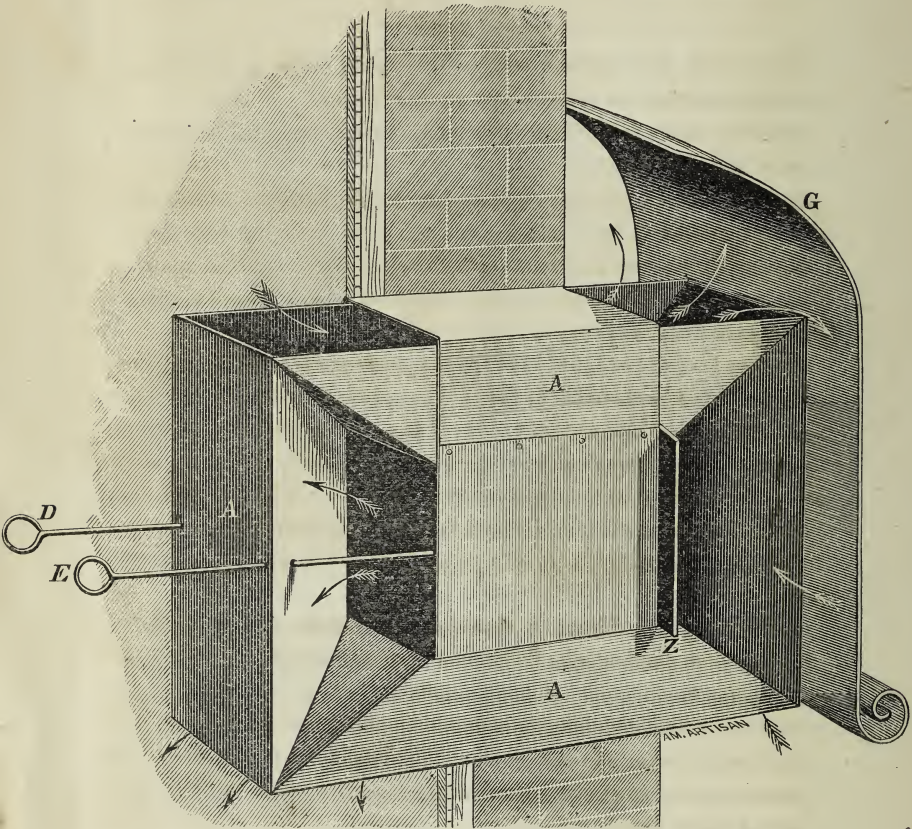
All state-rooms above the main deck of steamers and other vessels may be rendered healthy and comfortable by inserting this kind of Ventilator, only being mindful that the area of the room and number of inmates must regulate the size and number of Ventilators to be used for ventilating the same.

Its mode of operation is: The top and bottom air-boxes are not much affected by side currents of out-door air, but the side air-boxes are principally controlled by them; in this way the air flows in on the windward side, which increases the pressure of air in the room; at the same time the wind, in passing over the outside end of the Ventilator, tends to a partial vacuum, and assists to accelerate the outward motion of the warm, impure air from within, through the leeward side of the Ventilator.

But the top and bottom air-boxes are mainly controlled by the difference in the temperature of air out-door and inside the room, and again, by the difference of temperature there is in the air at the top and bottom of the Ventilator in the room. That is, the warm, impure air rises to the top of the room, and flows out at the top air-box of the Ventilator as fast as the heavier cool air flows in through the bottom air-box of the Ventilator.

In order to guard against injurious currents of cold air in the room, each Ventilator is furnished with a distributing hood, which is perforated with small holes, so as to break the inward current of cold air into small streams, and so present a greater surface of cold air to the heated, impure air in the room, that the diffusion of gases may be more rapid, and thereby destroy all currents of cold air in the room.

It is often asserted that the impure air falls and rests on the floor of the apartment. This is so, but only under the following circumstances: Where one hundred persons are shut up in a room twenty feet square for five or six hours, without any mode of supplying them with pure air; and as it is estimated that each child respire and exhausts not less than thirty-five cubic feet of pure carbonic-acid gas

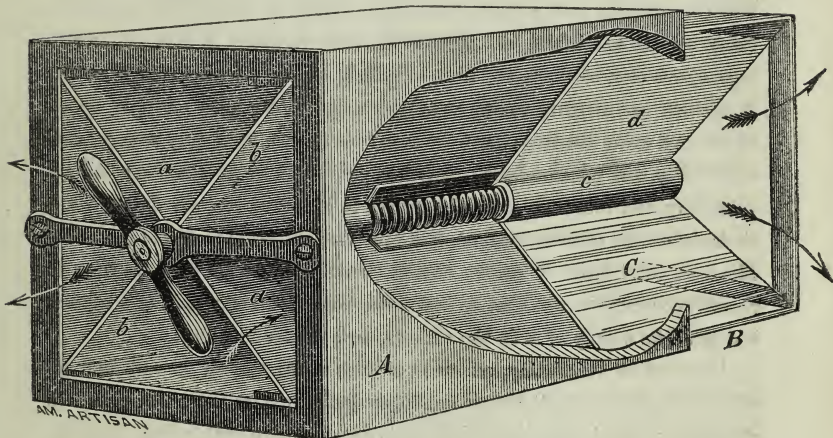


each hour, under such and similar circumstances the excess of this poisonous gas over pure atmospheric air must fall to the floor; but this can never occur where there is a sufficient supply of oxygen present.

BURNETT'S PATENT SIDE-LIGHT VENTILATOR FOR SHIPS.

This Ventilator is constructed for the following purpose, viz.:

That where side-light openings are necessarily cut through the hull of a ship for the admission of light to state-rooms, pantries, etc., the openings may be made to serve the double purpose of ventilation as well as light, and at the same time form a safe and tight shutter when closed against the pressure of water outside.



It will be seen that the bearings of the wings in each angle work on finished surfaces, which will not admit of any fore-and-aft or vertical motion.

The outboard and inboard motions are controlled by a strong screw, working through the hub of the cast wings, and resting in a bearing formed in the cross-bar inboard of the opening. This screw may, and should, have a quick thread, to give a rapid motion outboard and inboard to the wing-light deflector.

The operation is as follows: When the wind is directly against the side of the vessel the air will pass in through all of the openings, if the state-room doors are open, or if there be any other openings for the egress of the incoming current of air. If not, and the apartment is a closed one, then the air will flow in through three sides of the

Ventilator, displacing the warm and impure air, forcing it out through the top opening of the Ventilator. And when the wind is forward or aft a current of pure air flows in the windward side of the Ventilator, and the impure air out of the top and leeward side of the same.

But when there is a perfect calm, and the temperature inside is higher than that of the outside air, there will be a constant flowing in through the bottom air-duct of cool air, and a corresponding outward motion of warm air through the top. This is invariably so.

place → We are dwelling at the bottom of an immense ocean of air, which presses upon all sides of us with the weight of tons. It accompanies us into all places, unless, by special arrangements, we contrive to bar it out. After all that the infinitely wise Creator has done to supply us with this first and highest of earthly necessities, we ungratefully refuse to admit it into our dwellings, stores or workshops, but choose, rather, to cut ourselves off from the beneficent and all-invigorating atmosphere, by retiring into air-tight apartments, and using the same gases over and over again, as if they were a taxed commodity, and we all misers. It is because the air is so abundant and all-pervading, and therefore costs no exertion to obtain it, and also because it is an invisible and ethereal medium, and therefore not fitted to strike the senses like most other forms of matter, that its relations to animal life have been so recently determined, and that so little attention is generally paid to a copious and healthful supply of it in the arrangements of our buildings.

The need of ventilating, renewing or exchanging the air in any and all apartments where people live, is no longer questioned by those who choose to examine and think upon this important subject, and all such admit that the subject of a perfect system of ventilation is one of the most important questions of this day. The undersigned, with others, believing that his system will meet every requirement in that direction, takes this as one of the modes of bringing it before the public. This system consists of various devices of applying his plan of renewing the air in apartments, which seems to meet all and every case that is likely to arise, either in dwelling houses, shops or ships, &c.

ROOF AND ATTIC VENTILATOR.

The top story or attic rooms of all dwelling houses are rendered almost useless during the summer months from the action of the sun upon the roof, heating the confined air in the cock-loft or space between the roof and ceiling of the rooms to such a high temperature as to produce the above result. These rooms may not only be kept at about the same temperature as those below during the heat of summer, but may be rendered healthy and sweet both winter and summer by a constant exchange of air by means of this system of ventilation.

The ventilators may be constructed either of metal or wood, highly ornamental or plain, as may be desired, and also to harmonize with the architecture of the building if required; in such cases they add much to the beauty of a house by relieving that plainness of the roof, which seems to be desirable in most cases, especially those in the country.

Combination DWELLING HOUSE VENTILATOR.

For a dwelling, five or six air shafts are required, forming a circle and extending out a proper distance to form the openings, with deflections, etc., above the roof of the building.

The five or six air ducts or shafts pass down into an air-tight pantry formed for the purpose in the garret, about four feet square or more, and twelve or fourteen feet high in the clear, with a horizontal division or false ceiling about ~~six~~ ^{ten} or eight feet from the floor, thus dividing the pantry into two compartments in its height. The upper compartment may be called the warm-air chamber, and the lower one the cold-air chamber or reservoir. All the air ducts end about three inches below the ceiling of ~~each~~ ^{flanges} warm air chamber, and in order to conduct a descending current of cold air through the warm air chambers, a series of six conical shaped ~~rings~~ ^{flanges} (which act as tunnels to deflect the descending current to the centre, and prevent its diffusing with the warm air in passing through this chamber down into the cold-air reservoir below) are placed one above the other at about three inches apart, and supported in their position by being connected by three rods or strips of iron or

*to the air shaft
as shown in tracing*

the outer edge at equal distances apart, which rest on the false ceiling that divides the warm chamber from the cold. The bottom conical ~~ring is attached to a short piece of air pipe about three feet long, which passes down through the false ceiling into the cold chamber below.~~ *flange*

The results are, that by ending the air ducts opposite to each other, when one or more is on the windward, there will be one or more on the leeward; in either case there will be a descending current of cold, pure air down the windward air shaft, of about double the force of the outdoor movement of air (this increased force in the descending current is obtained by the arrangement of deflectors in the head at the upper end of the air shafts), which passes down through the circular conical ~~rings or deflectors into the cold-air reservoir and from thence is conducted by means of pipes connected to or at the bottom of the cold-air reservoir, and passing between the floor and ceiling to be delivered into the apartments below through one-half of an ornamental centre piece constructed for the purpose.~~ *flanges* The other half of the centre piece will be required to allow the warm, impure air to flow through and pass into a corresponding air pipe, which is brought back to the air reservoir, and passing up between the studs, delivers it into the warm-air chamber, when it will pass up through the leeward air shaft and out at the top. The necessity of the conical ~~rings~~ in the warm-air chamber is now easily comprehended, when we see that the draft of the leeward air shafts is made to assist the exit of the warm, impure air from the apartments below. *the pipe*

This arrangement of the deflecting conical ~~rings~~ in the warm-air chamber answers three purposes:—First, They deflect the descending current of cold air to the centre and prevent it from spreading. Second, They prevent the warm air from diffusing with the descending cold air. Third, The principal cause of their introduction in this place was, that as each air shaft became the leeward by the shifting of the wind, that whatever force there should be in the upward draft, it should be employed to remove the impure air from the apartment below. The consequence is, that we have a constant exchange of pure atmospheric air for the impure air in each apartment in any and all buildings where it may be desirable by the above-named device. *flanges*

The details relating to the mode of distributing fresh air into the apartments from the cold-air chamber, and also the arrangement of pipes to conduct the impure air from the apartments up into the warm-air chamber, may be changed in their direction and finish so as to suit the taste or convenience of all—only being careful to keep up the proper proportion of area to the area of the shafts in the ventilator. In the construction of new buildings,

where all necessary pipes can be inserted as the building progresses, this one set of chambers at the top of the house will answer the purpose of ventilating each apartment, if care be taken to construct and keep up a proper proportion of the whole arrangement for ventilating; also, all angles should be avoided, and easements substituted where the direction of pipes is changed.

8—The chamber should extend from the roof downward not less than ~~four~~ ^{fourteen} feet, in order to obtain ample height in the cold-air chamber, so as to increase the pressure downward in the distributing pipes leading from the cold-air chamber to the several apartments below by the weight of cold air in the chamber above. The ventilator, to supply this chamber with cold air, should be constructed with five air shafts, or more, each having an area of from 200 to 500 inches, as the area to be ventilated may seem to demand. The warm-air chamber, with the conical deflecting ~~ribs~~ ^{ribs}, &c., to be same as above specified.

The single chambers below have several advantages over all other devices for ventilating. First, the room to be occupied is less valuable, being at the top of the house. Lastly, though not the least, it is less expensive. Architects and builders need no instructions as to the best mode of placing the pipes in walls to conduct the cold air down, or to convey the impure air up into the warm-air chamber above; the necessities, when understood, will suggest the proper way and means.

B. J. Burnett

VENTILATION.

This system of ventilation is adapted to Dwellings, Churches, Hospitals, Theatres, Halls and Shops. Also to Ships' Holds, Cabins, State-Rooms, or any place requiring ventilation; the foul air is taken away and fresh air introduced without creating any draft or annoyance to any one from a current of air, thereby ensuring health and comfort to all public and private buildings.

The system has been thoroughly tested, and is a perfect success; it is not only theoretically correct, but practically so, and will well repay any one who contemplates any new building to call and examine it. It is also perfectly applicable to old buildings or ships.

All communications on the subject may be addressed to B. J. Burnet, Novelty Iron Works, New York, or Abner Mills, 125 Avenue D, New York.

HAT VENTILATOR.

In order that all may demonstrate that this system is correct, the Inventor has, by a neat and ornamental device, adapted it to the ventilation of Hats, and feels no hesitation in asserting (and is sustained by

Fig. 3



Fig. 2

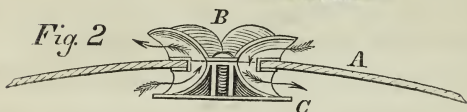
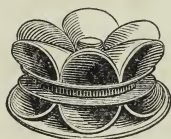


Fig. 1



the highest medical authority) that all who wear this Ventilator will not only have a pleasant sensation of coolness to the head, but ensure a good growth to the hair.

Principal Depot for the sale of Hat Ventilators, 31 Beekman Street, New York.

BURNETT'S SYSTEM OF VENTILATION.

Churches, Large Halls, Banking and Assembly Rooms, are ventilated by bringing the Air Shafts direct (or otherwise, as the locality may demand) from the roof through the ceiling into the diffusing hood, which delivers the air through its perforated sides in streams, by which means all currents are avoided.

This system may be seen in operation in Messrs. Brown Brothers & Co.'s New Banking House, 59 Wall Street.

B. J. BURNETT.

TESTIMONIALS.

NEW YORK, July 18, 1866.

MR. B. J. BURNETT, *Novelty Iron Works, New York* :

DEAR SIR :—It gives me much pleasure to state that your "Patent Ventilator," applied to my residence at Rye, has given entire satisfaction. The attic rooms during the recent unusually warm weather have been more cool than those on the second floor.

Yours very truly,

W. E. EVERETT.

OFFICE OF THE NOVELTY IRON WORKS, }
NEW YORK, July 11, 1866. }

B. J. BURNETT, Esq. :

DEAR SIR :—In answer to your enquiry as to results received from the Ventilator put up by you at my house at Mount Vernon, I cheerfully comply by stating that the rooms (particularly the sleeping apartments) were, before the introduction of it, very close and warm, and are now quite pleasant and cool.

I am, truly yours,

WILLIAM HATHAWAY.

OFFICE OF THE NOVELTY IRON WORKS, }
NEW YORK, July 3, 1866. }

B. J. BURNETT, Esq. :

MY DEAR SIR :—I have used two of your Ventilators on my house with great success; the rooms in which I put them are greatly cooler in hot weather than they ever were before, and our attic, which we could not use before with any comfort, is now a very comfortable place.

I am sure it is the most perfect mode of ventilating possible.

Yours,

J. W. STRATTON.

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B. J. BURNETT, Esq. :

SIR :—Your Ventilators, as put up on the Novelty Yard smith-shop, during the winter of 1863 and 1864, in a practical point of view exceed my expectations.

I find a constant current of fresh air is, at all times, flowing in the shop, while at the same time an equal quantity of the noxious gases is escaping.

I would most cheerfully commend your invaluable Ventilators to all parties desiring such an improvement.

JOSEPH DALLY,

Foreman Smith-shop, Novelty Iron-works.

MOUNT VERNON, N. Y., January 21, 1865.

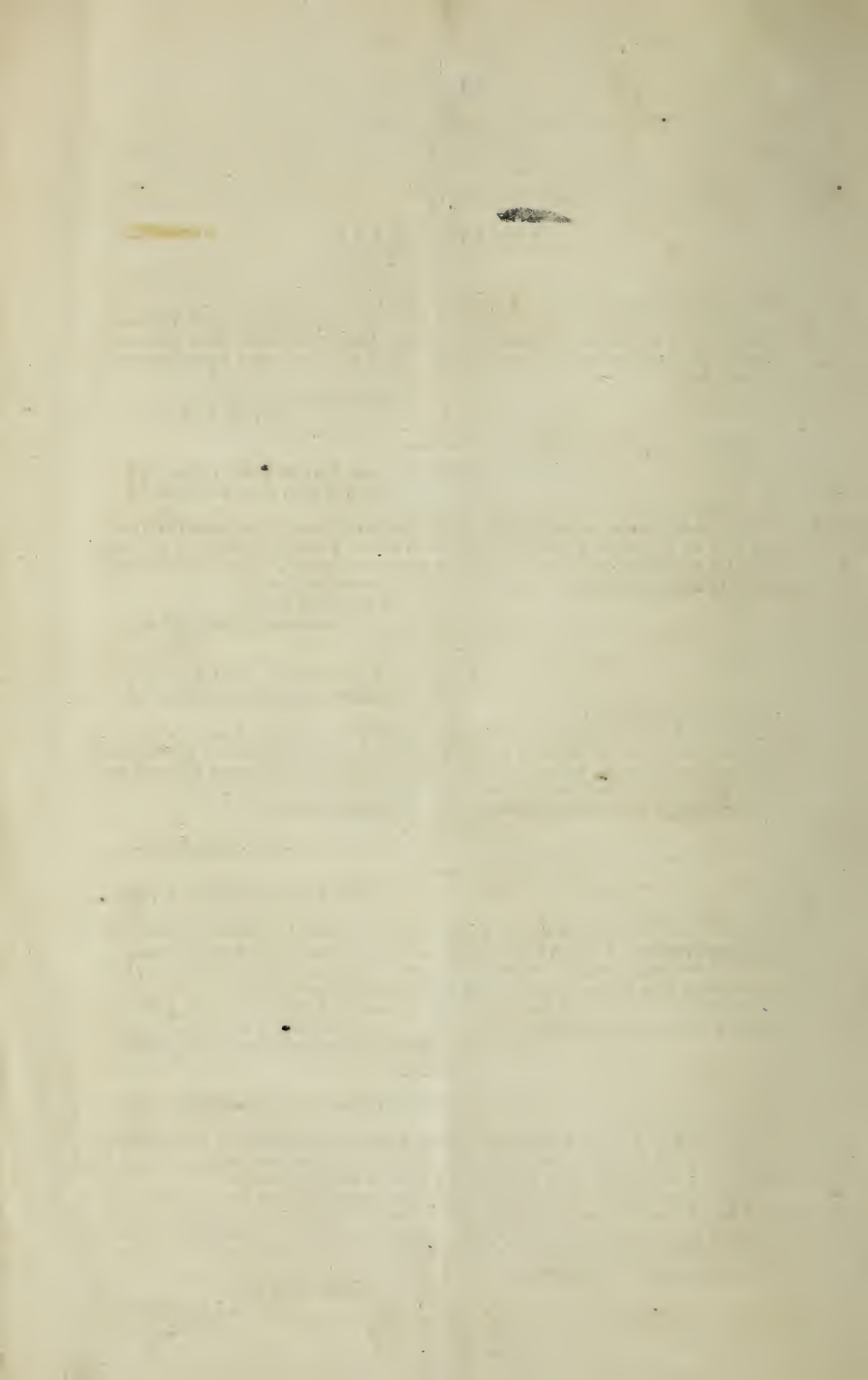
B. J. BURNETT, Esq. :

SIR :—I had a good opportunity, during the summer of 1864, of testing the merits of your Ventilator, as applied to the cooling of rooms situated under a flat metal roof, and can say that I was highly pleased with the results.

Dormitories hitherto very uncomfortable, on account of the hot air between the roof and the ceiling, were rendered quite agreeable during the heat of the day, and at night the temperature was much lower than ever before. I think that you have discovered the true principle for a Ventilator, and am confident that its application will give general satisfaction.

Yours, very truly,

WILLIAM HOWE.



BURNETT'S

COMBINATION VENTILATOR.

My system of ventilating is based upon this law, namely, that when a given surface is presented at right angles to the out-door current of air, as the obstructed current accumulates power to force a passage over the top and around each side, it causes a tendency to a partial vacuum on the leeward side of the obstruction. The result is that, whatever pressure there may be against the windward side, there is the same amount of force exerted in a draft on the leeward side of the same. In order to take advantage of this law, I construct a ventilator which presents openings to the out-door current of air, provided with a roof and deflectors each way to deflect and turn the current down through the windward pipes, or air shafts, into the cold-air reservoir (or direct down to the place to be ventilated); and as the deflecting arrangement is the same all around the head of the ventilator (which is formed of five or more air shafts neatly cased in), the same arrangement for deflecting the air in and down the air shafts on the windward side tends to increase the draft up and out of the leeward air shafts, which gives a constant exchange of pure air for impure. From the working of the above we are able, by a new and unerring, but simple device, to renew the air in every room, pantry, and water-closet in a dwelling house, from one ventilator on the roof. The ventilator may extend above the roof from three to six feet, either plain or ornamented, to harmonize with the architecture of the building, com-

posed of from five to eight air shafts of sufficient area to give an ample supply of air to each apartment to be ventilated. The air shafts pass down through the roof into and through the warm-air chamber, ending just below the ceiling of the cold-air chamber. The above-named chambers are required to be from four to eight feet square in the clear, eight feet or more in height, extending from the roof down to the upper floor of the building, and divided in its height about thirty inches below the roof. The upper part I call the warm-air chamber, and the lower the cold-air chamber. The outward half of the air shafts in the warm chamber, about twenty-four inches in height, is cut and bent out at right angles to each other, and circular conical flanges inserted and riveted horizontally from one angular part of the pipe to the other, about three inches above each other. The inner edge of the flange, which is the lowest, forms a circle and leaves the same area as the air shafts above and below. Thus the outer side of the air shaft in the warm-air chamber is open, except such divisions as the circular conical flanges form, which act as deflectors to the descending current of cold air, and prevent it from diffusing with the warm air in the chamber, as it passes down into the cold-air chamber. The results of this combination are as follows:

First. The windward air shafts, by means of the deflectors at the head, are continually filled with a descending current of pure air (of more than double the velocity of the out-door current), which passes direct through the warm chamber into the cold chamber. The force of this descending current increases the pressure in this chamber above the atmospheric pressure in the apartment below. This fact gives force and velocity of current through the distributing pipes from the bottom of the cold-air chamber to the rooms below.

Second. In the leeward air shafts and warm chamber, the above is simply reversed in every particular, and to the same amount. The draft up and out at the leeward side of the ventilator is supplied through the upper conical flanges in the warm chamber,

which reduces the pressure in this chamber below the atmospheric pressure in the rooms to be ventilated; and this fact gives a constant draft to the pipes from the rooms below to the warm chamber, and through the circular conical flanges into the leeward air shafts, and out at the head; and so an infallible renewal of air in each apartment connected with these two chambers is constantly kept up, independent of any difference of temperature.

But I am told we cannot depend upon the natural out-door current of air for ventilation, there being so many days when there is no wind. I have, therefore, during the last eight years, bestowed some thought and not a little care to ascertain if such is the fact, and I have never yet found a time of fifteen minutes' duration when the air did not move over fifty feet per minute; and should there be such a calm for ten hours each day, and the air shaft in my ventilator were only one foot in area, and but two of them to the windward, by my system of ventilation we should distribute 6000 cubic feet of pure air throughout the building per hour, and of course remove the same amount of the impure.

B. J. BURNETT,

NOVELTY IRON WORKS, NEW YORK.

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